

1 which covers said first conductive layer, a second conductive layer of a material that is the
2 same as that of source/drain electrode of said thin film transistor and which is on said first
insulating layer, and a second insulating layer of a material that is the same as that of a
3 protection insulating layer of said thin film transistor and which covers said second
4 conductive layer.
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REMARKS

As a preliminary matter, with regard to the drawings, Applicants have included herewith marked-up copies of drawings 1A-8C, with the proposed changes in red. As can be seen from the proposed changes, Applicants have attempted to respond to the points noted by the Examiner in the Office Action mailed March 1, 2001. Approval of the proposed drawing changes is respectfully requested.

As a second preliminary matter, the claim numbers have been amended according to the Examiner's suggestions. Withdrawal of the objection thereto is respectfully requested.

As a third preliminary matter, originally-numbered claim 152 has been canceled, and its subject matter incorporated into independent claim 149 (now renumbered as claim 150). Originally-numbered claim 151, on the other hand, has now been renumbered as claim 152. By this amendment, there should no longer be a claim numbered 153.

Claim 155 (originally filed as claim 154) stands rejected under U.S.C. 101 as being a substantial duplicate of claim 154 (originally filed as claim 153). Applicants have amended claim 155 to correct for the inadvertent transcription error in the Preliminary Amendment, filed October 12, 2000. Reconsideration and withdrawal of the rejection thereto are respectfully requested.

Claims 150-153 and 162 stand rejected under 35 U.S.C. 102(b) as being anticipated by Koma (U.S. 5,608,556). Applicants assume the Examiner's rejection is stated according to the new renumbering of the claims. Claim 153 (as labeled by the Examiner) has been canceled, therefore rendering the rejection thereto moot. With respect to claims 150-152 and 162, Applicants respectfully traverse this rejection because the cited reference neither discloses nor suggests protrusions as a second domain regulating means, as recited by (newly numbered) claim 150 of the present invention, as amended.

Claim 150 has been amended to include the subject matter of originally-numbered claim 152, which original claim has now been canceled without prejudice. Independent claim 150 now clearly recites protrusions as domain regulating means. The Examiner has acknowledged in Paper No. 6 that the cited reference does not disclose protrusions as domain regulating means. Accordingly, for at least this reason, the Section 102 rejection of (newly renumbered) claims 150-152 and 162 based on Koma is respectfully traversed. ①

Furthermore, Koma does disclose first and second regulating means being slits, as asserted by the Examiner. Koma merely discloses one X-shaped slit 33a as one domain regulating means. Although Koma discloses a plurality of these slits, a mere plurality does not create a separate domain regulating means to satisfy the phrase “first and second domain regulating means.” Koma teaches that all the X-shaped slits 33 perform the same function.

Moreover, nowhere does Koma teach that any of the slits 33 “substantially surround” any other slits. Claim 150 of the present invention, on the other hand, recites among other things that the first domain regulating means substantially surrounds the second domain regulating means in the display area of the pixels. Some examples of these features of the present invention are shown in FIGS. 88-91 of the present invention. Koma discloses nothing similar to, or suggestive of, these features. For at least these additional reasons, the Section 102 rejection based on Koma is respectfully traversed.

Claims 154-161 and 163-170 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Koma. Applicants again assume the Examiner’s rejection is stated according to the new renumbering of the claims. Applicants respectfully traverse this rejection because the cited reference neither discloses nor suggests protrusions as domain regulating means.

As discussed above, the Examiner has acknowledged that Koma does not teach protrusions. The Examiner has cited protrusions only by Official Notice, asserting that protrusions and slits are “known equivalents” in the art. However, the Examiner has cited

no references to support this assertion. In fact, protrusions perform differently than slits, and the use of protrusions in the present invention provide distinct advantages over the display device disclosed by Koma. (3)

Koma uses the slits 33 in conjunction with orientation control electrodes 22. Use of the orientation control electrodes significantly increases the cost of producing the display device. However, in the present invention, using protrusions eliminates the need for an orientation electrode, thereby realizing a significant cost production advantage, among other things, over the device of Koma. Accordingly, for at least these reasons, the Section 103 rejection based on Koma is respectfully traversed.

Additionally, the slits and protrusions of the present invention operate together differently than the joint-operation of the slit 33 and electrode 22 as taught by Koma. There is no suggestion from Koma that protrusions may be substituted for slits in Koma's configuration. It can clearly be seen that merely replacing the slits 33 of Koma with protrusions similar to those of the present invention, as suggested by the Examiner, would render the device of Koma inoperable. Koma therefore teaches away from the use of protrusions in the present invention. A prior art reference may not be the basis, alone or in combination, for an obviousness rejection when that reference teaches away from the proposed modification. Because modifying the device of Koma to substitute protrusions for the X-shaped slits 33 would render such a device essentially inoperable, for at least these additional reasons, the Section 103 rejection based on Koma is respectfully traversed.

Regarding claim 163 (originally numbered 162) specifically, Koma neither discloses nor suggests a protrusion-like structure on a substrate which is formed of a member the same as a thin film transistor, as in claim 163 of the present invention. Since the Examiner has already acknowledged that Koma neither discloses nor suggests protrusions, Koma could neither disclose or suggest the structure of a protrusion according to claim 163. Accordingly, for at least these reasons, the rejection of claim 163 based on Koma, and of claims 164-166 as claims depending directly or indirectly from independent claim 163, is respectfully traversed.


Regarding claim 167 (originally numbered 166) specifically, Koma neither discloses nor suggests a protrusion-like structure on a substrate which is provided at areas where conductive members corresponding to pixel electrodes are not provided, as recited by claim 167 of the present invention. Again, since the Examiner has already acknowledged that Koma neither discloses nor suggests protrusions, Koma could neither disclose or suggest this distribution of a protrusion as in claim 167. Accordingly, for at least these reasons, the rejection of claim 167 based on Koma, and of claims 168-170 as claims depending directly or indirectly from independent claim 163, is respectfully traversed.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached Appendix is captioned **“Version with markings to show changes made.”**

For all of the foregoing reasons, Applicants submit that this Application, including claims 150-152 and 154-170, is in condition for allowance, which is respectfully requested. The Examiner is invited to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Please cancel claim 152 without prejudice and amend claims 149-169 as follows:

1 [149] 150. (Amended) A liquid crystal display device comprising:
2 a first substrate and a second substrate for sandwiching a liquid crystal having
3 a negative dielectric constant anisotropy; and
4 first and second domain regulating means for regulating azimuths of
5 orientations of said liquid crystal when a voltage is applied to said liquid crystal,
6 wherein when vertically seen to the substrates, said first and second domain
7 regulating means are arranged on said substrates so that said first domain regulating means
8 substantially surrounds said second domain regulating means in the display areas of the
9 pixels[.], and
10 wherein said first and second domain regulating means consist of protrusions
11 provided on said substrates or slits provided at electrodes on said substrates.

1 [150] 151. (Amended) A liquid crystal display device according to claim
2 [149] 150, wherein when vertically seen to the substrates, outer edges of said first domain
3 regulating means substantially form closed curves.

1 [151] 152. (Amended) A liquid crystal display device according to claim
2 [149] 150, wherein plural areas surrounded by said first domain regulating means are formed
3 in each pixel.

The claim originally numbered as 152 has been canceled without prejudice.

There is no longer any claim numbered 153 as of this Amendment.

1 [153] 154. (Amended) A liquid crystal display device according to claim
2 [152] 153 wherein said first domain regulating means consists of protrusions provided on
3 said first substrate, and said second domain regulating means consists of protrusions
4 provided on said second substrate.

1 [154] 155. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means consists of protrusions provided on
3 said first and second substrate, and said second domain regulating means consists of
4 protrusions provided on said second substrate.

1 [155] 156. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means consists of slits provided on said first
3 substrate, and said second domain regulating means consists of slits provided on said second
4 substrate.

1 [156] 157. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means consists of slits provided on said first
3 and second substrates, and said second domain regulating means consists of slits provided
4 on said second substrate.

1 [157] 158. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means consists of protrusions provided on
3 said first substrate, and said second domain regulating means consists of slits provided on
4 said second substrate.

1 [158] 159. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means consists of protrusions provided on
3 said first substrate and slits provided on said second substrate, and said second domain
4 regulating means consists of slits provided on said second substrates.

1 [159] 160. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means consists of slits provided on said first
3 substrate, and said second domain regulating means consists of protrusions provided on said
4 second substrate.

1 [160] 161. (Amended) A liquid crystal display device according to claim
2 [152] 153, wherein said first domain regulating means if consisted of slits provided on said
3 first substrate and protrusions provided on said second substrate, and said second domain
4 regulating means consists of protrusions provided on said second substrate.

1 [161] 162. (Amended) A liquid crystal display device according to claim
2 [149] 150, wherein four domains in which orientations of said liquid crystal are substantially
3 different are formed in an area surrounded by said first domain regulating means when a
4 voltage is applied to said liquid crystal.

1 [162] 163. (Amended) A liquid crystal display device comprising a first
2 substrate and a second substrate for sandwiching a liquid crystal having a negative dielectric
3 constant anisotropy,
4 wherein said first substrate includes thin film transistors and domain regulating
5 means, and

1 wherein said domain regulating means is a protrusion-like structure on said first
2 substrate, and said protrusion-like structure is formed of a member that is the same as at least
3 one member constituting said thin film transistors.

1 [163] 164. (Amended) A liquid crystal display device according to claim
2 [162] 163, wherein said domain regulating means includes a first conductive layer of a
3 material that is the same as that of a gate electrode of said thin film transistor, a first
4 insulating layer of a material that is the same as that of a gate insulating layer of said thin
5 film transistor and which covers said first conductive layer, a second conductive layer of a
6 material that is the same as that of source/drain electrode of said thin film transistor and
7 which is on said first insulating layer, and a second insulating layer of a material that is the
8 same as that of a protection insulating layer of said thin film transistor and which covers said
9 second conductive layer.

1 [164] 165. (Amended) A liquid crystal display device according to claim
2 [163] 164, wherein pixel electrodes connected to said thin film transistor are provided on said
3 first substrate, and said domain regulating means is provided in areas having no pixel
4 electrode on said first substrate.

1 [165] 166. (Amended) A liquid crystal display device according to claim
2 [163] 164, wherein said domain regulating means is arranged at slits provided on said pixel
3 electrodes.

1 [166] 167. (Amended) A liquid crystal display device comprising a first
2 substrate and a second substrate for sandwiching a liquid crystal having a negative dielectric
3 constant anisotropy,

4 wherein said first substrate includes thin film transistors, domain regulating
5 means and pixel electrodes connected to said thin film transistor, and

6 wherein said domain regulating means is a protrusion-like structure and is
7 provided at areas where conductive members corresponding to said pixel electrodes are not
8 provided.) ?

1 [167] 168. (Amended) A liquid crystal display device according to claim
2 [166] 167, wherein said domain regulating means is arranged at slits provided on said pixel
3 electrodes.

1 [168] 169. (Amended) A liquid crystal display device according to claim
2 [167] 168, wherein said domain regulating means is formed of a member that is the same as
3 at least one member constituting said thin film transistors.

1 [169] 170. (Amended) A liquid crystal display device according to claim
2 [168] 169, wherein said domain regulating means includes a first conductive layer of a
3 material that is the same as that of a gate electrode of said thin film transistor, a first
4 insulating layer of a material that is the same as that of a gate insulating layer of said thin
5 film transistor and which covers said first conductive layer, a second conductive layer of a
6 material that is the same as that of source/drain electrode of said thin film transistor and
7 which is on said first insulating layer, and a second insulating layer of a material that is the
8 same as that of a protection insulating layer of said thin film transistor and which covers said
9 second conductive layer.